



## Blaine A. Christiansen, Ph.D.

### Clinical Interests

My primary research interest is the adaptation of musculoskeletal tissues to the mechanical environment, injury, or disease. The musculoskeletal system has an innate ability to repair and optimize itself based on the mechanical demands placed on it.

By studying this adaptation, we are able to uncover underlying mechanisms that contribute to diseases such as osteoporosis and osteoarthritis.

My research primarily utilizes small animal models of injury, mechanical loading or unloading. Musculoskeletal adaptation is quantified in these models using advanced imaging techniques, histology, and mechanical testing.

My current projects include investigation of biomechanical and biological mechanisms that contribute to the development of post-traumatic osteoarthritis, and the effect of peripheral nerve function on bone metabolism and bone adaptation to mechanical loading or fracture.

**Title** Assistant Professor

**Specialty** Orthopaedic Research

**Department** [Orthopaedic Surgery](#)

**Division** Orthopaedic Surgery

**Education** Ph.D., Washington University College of Engineering, St. Louis, Missouri, 2007

B.S., University of Nebraska, Lincoln, Nebraska, 2001

M.S., Washington University, St. Louis, Missouri, 2004

### Professional Memberships

American Society for Bone Mineral Research

Orthopaedic Research Society

OsteoArthritis Research Society International, Active Member

### Honors and Awards

IBMS/ASBMR Harold M. Frost Young Investigator Award, 2011

American Society for Bone and Mineral Research, Young Investigator Award, 2010

United States Bone and Joint Decade – Young Investigators Initiative Participant, 2010

ASME Summer Bioengineering Conference, 1st Place- Student Paper Competition, 2005



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### Select Recent Publications

- Ishida K, Acharya C, Christiansen BA, Yik JH, Dicesare PE, Haudenschild DR. Cartilage oligomeric matrix protein enhances osteogenesis by directly binding and activating bone morphogenetic protein-2. *Bone*. 55:(1):23-35.
- Ellman R, Spatz J, Cloutier A, Palme R, Christiansen BA, Bouxsein ML. Partial reductions in mechanical loading yield proportional changes in bone density, bone architecture, and muscle mass. *J of Bone and Mineral Research*. 2012;28:(4):875-85.
- Christiansen BA, Anderson MJ, Lee CA, Williams JC, Yik JH, Haudenschild DR. Musculoskeletal changes following non-invasive knee injury using a novel mouse model of post-traumatic osteoarthritis. *Osteoarthritis and Cartilage*. 2012;20:(7):773-82.
- Toupadakis CA, Wong A, Genetos DC, Chung DJ, Muruges D, Anderson MJ, Loots GG, Christiansen BA, Kapatkin AS, Yellowley CE. Long term administration of AMD3100, an antagonist of SDF-1/CXCR4 signaling, alters fracture repair. *J of Orthopaedic Research*. 2012;30:(11):1853-9.
- Symons JE, Entwistle RC, Arens AM, Garcia TC, Christiansen BA, Fyhrie DP, Stover SM. Mechanical and morphologic properties of trabecular bone from horses with a bone fragility syndrome. *Am J of Veterinary Research*. 2012;73(11):1742-51
- Samelson EJ, Christiansen BA, Demissie S, Broe KE, Louie-Gao Q, Cupples LA, Roberts BJ, Manoharan R, D'Agostino J, Lang T, Kiel DP, Bouxsein ML. QCT measures of bone strength at the thoracic and lumbar spine: The Framingham study. *J of Bone and Mineral Research*. 2011;27:(3):654-663.
- Christiansen BA, Kopperdahl DL, Kiel DP, Keaveny TM, Bouxsein ML. Mechanical contributions of the cortical and trabecular compartments contribute to differences in age-related changes in vertebral body strength in men and women assessed by QCT-based finite element analysis. *J of Bone and Mineral Research*. 2011;26:(5):974-83.
- Samelson EJ, Christiansen BA, Demissie S, Broe KE, Meng CA, Yu W, Cheng X, O'Donnell CJ, Hoffmann U, Genant HK, Kiel DP, Bouxsein ML. Reliability of vertebral fracture assessment using multidetector CT lateral scout views: the Framingham osteoporosis study. *Osteoporosis International*. 2011;22:(4):1123-31.
- Christiansen BA, Bouxsein ML. Methods in Bone Biology in Animals: Imaging. In G. Duque, K. Watanabe (Eds.), *Osteoporosis Research: Animal Models*. 2011;45-56.
- Bouxsein ML, Boyd SK, Christiansen BA, Guldborg RE, Jepsen KJ, Müller R. Guidelines for assessment of bone microstructure in rodents using microcomputed tomography. *J of Bone and Mineral Research*. 2010;25:(7):1468-1486.



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